

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING***SE 3309A – DATABASE MANAGEMENT SYSTEMS*****Course Outline Fall 2065**

COURSE DESCRIPTION: The focus of this course is to teach database fundamentals required in the development and evolution of most software applications. The course introduces the principles of relational database management systems. In particular, the Entity-Relationship approach to data modeling, the relational model of database management systems (DBMS) and the use of structured query languages (SQL) will be covered. The course also covers relational algebra and the use of SQL in a programming environment, and a touch upon security and authorization. Students will learn the practical benefits that stem from using a DBMS to develop software applications. Hands on experience will make use of a state-of-the-art DBMS. Students will develop a small project following software engineering principles with an emphasis on designing a schema, loading data, and implementing queries for an application.

ACADEMIC CALENDAR:

The focus is to teach database fundamentals required in the development and evolution of most software applications by providing a basic introduction to the principles of relational database management systems such as Entity-Relationship approach to data modeling, relational model of database management systems and the use of query languages.

PREREQUISITES: SE 2203A/B, SE 2205A/B.

ANTIREQUISITES: AISE 3309A/B, Computer Science 3319A/B, Computer Science 3120A/B.

CEAB ACADEMIC UNITS: Engineering Science 70%, Engineering Design 30%.

INSTRUCTOR INFORMATION:

Name:

Office/Office Hours:

Email:

CONTACT HOURS:

Timetable information is available at <https://draftmyschedule.uwo.ca/>.

LECTURE:	
LABS:	

RECOMMENDED/REQUIRED TEXT: T. Connolly & C. Begg, Database Systems: A Practical Approach to Design, Implementation, and Management, Sixth Edition, 2015, Addison Wesley.

RECOMMENDED/ REQUIRED SOFTWARE: MySQL

RECOMMENDED RESOURCES/REFERENCES: Course notes

GENERAL LEARNING OBJECTIVES (CEAB GRADUATE ATTRIBUTES)

Knowledge Base		Engineering Tools	D	Impact on Society	
Problem Analysis	D	Individual & Teamwork		Ethics and Equity	
Investigation		Communication		Economics and Project Mgmt.	
Design	D	Professionalism		Life-Long Learning	

Notation: x represents the content level code as defined by the CEAB. blank = not applicable; I = introduced (introductory); D = developed (intermediate) and A = applied (advanced).

Rating: I – The instructor will introduce the topic at the level required. It is not necessary for the student to have seen the material before. D – There may be a reminder or review, but the student is expected to have seen and been tested on the material before taking the course. A – It is expected that the student can apply the knowledge without prompting (e. g. no review).

COURSE MATERIALS: Content supporting lectures will be available on the course OWL site. The material for this course will be taught in both lectures and labs; therefore, it is important that you attend each lecture and most labs.

COURSE TOPICS AND SPECIFIC LEARNING OUTCOMES:

The following table summarizes the course learning outcomes along with CEAB GAIs where the GAIs in bold indicate ones to be measured and reported annually.

Course Objectives and Specific Learning Outcomes		CEAB Graduate Attributes Indicators
1. Introduction to Database Systems At the end of this section, students will be able to:		
a. Identify the importance of databases, the typical functions of Database Management Systems (DBMS), the components of DBMS environments, and the advantages and disadvantages of DBMSs; b. Describe the origins of the relational model and its terminology.	PA1	
2. Conceptual Database Design At the end of this section, students will be able to:		
a. Use the Entity-Relationship (ER) modeling in the conceptual database design; b. Identify additional data modeling concepts of the Enhanced Entity-Relationship (EER) model for conceptual database design.	D1	
3. Logical Database Design At the end of this section, students will be able to:		
a. Derive a set of relations from a conceptual model.	D4	
4. Normalization At the end of this section, students will be able to:		
a. Describe the purpose of normalization and undertake the process of normalization; b. Validate the set of relations using the technique of normalization.	D2, D3	
5. Relational Algebra At the end of this section, students will be able to:		
a. Form queries in relational algebra.	PA2	
6. SQL Statements: Query, Insert, Update, and Delete At the end of this section, students will be able to:		
a. Retrieve data from the database using SQL commands; b. Perform database insert, update, and delete using SQL commands.	PA3, D2, ET1, ET2, ET3	

Course Objectives and Specific Learning Outcomes	CEAB Graduate Attributes Indicators
7. SQL Data Definition, Constraints, Indexes, and Views At the end of this section, students will be able to:	
a. Define integrity constraints using SQL; b. Create indexes and views using SQL	D1, D2
8. Transactions and Triggers At the end of this section, students will be able to:	
a. Describe how ISO Transaction model works, b. Create and use Triggers.	PA2
9. Introduction to NoSQL Databases At the end of this section, students will be able to	
a. Differentiate between traditional relational databases and NoSQL databases in terms of data models, scalability, and use cases; b. Understand and identify the primary types of NoSQL databases: Document, Key-Value, Column-family, and Graph.	ET1

EVALUATION:

Course Component	% Worth	CEAB GAs ASSESSED
Homework/Laboratory Assignment 1	5%	
Homework/Laboratory Assignment 2	10%	D3
Homework/Laboratory Assignment 3	10%	ET1, ET3
Homework/Laboratory Assignment 4	10%	
Midterm Test	20%	PA2, D2,
Final Examination	45%	PA2, D2, D3, ET1

Note that the dates listed above are **tentative** and may be adjusted if needed.

For this course the following assessment has been designated as requiring supporting documentation:

MIDTERM TEST

Homework/Laboratory Assignments: There will be 4 assignments in this course as listed in the table below. Students will work in groups, will choose a project topic and work on these 4 assignments based on the chosen and approved topic. By the end of the 4th assignment, students will have developed a database application.

Assignment	Description	Weight
1	Requirement specification	5%
2	Relational Model/Normalization	10%
3	Creating the database system in a DBMS	10%
4	Web Interface for the database application	10%

COURSE POLICIES:

Midterm Test: The midterm test is **designated as requiring supporting documentation** for absence.

There will be one midterm test. The test will be closed book (no books, notes and calculators will be allowed), with a duration of two hours.

If a student misses a midterm examination, the exam will not be rescheduled. The student must follow the Instructions for Students Unable to Write Tests and provide documentation to their department within 24 hours of the missed test. The department will decide whether to allow the reweighting of the test, where reweighting means the marks normally allotted for the midterm will be added to the final exam. If no reasonable justification for missing the test can be found, then the student will receive a mark of zero for the test.

If a student is going to miss the midterm examination for religious reasons, they must inform the instructor in writing within 48 hours of the announcement of the exam date or they will be required to write the exam.

LABORATORIES: Labs will run every week starting the week of September 21st. One lab per assignment is mandatory, and all team members must attend together. During the mandatory lab, team members must discuss their assignment with TA and justify their choices. Additionally, a project demonstration is mandatory. Absence from any mandatory session or project demonstration without permission will result in a zero assigned to the corresponding assignment.

FINAL EXAMINATION: The final exam will take place during the regular examination period.

To obtain a passing grade in the course, a mark of 50% or more must be achieved on the final examination. A final examination mark < 50% will result in a final course grade of 48% or less.

LATE SUBMISSION POLICY:

If you require the deadline extension for the assignment, you must submit Academic Consideration Request at: <https://www.eng.uwo.ca/undergraduate/academic-consideration-for-absences.html>. If you are granted an extension, a new due date will be established. The approval of the Chair of your Department is not required if assignments are completed prior to the last day of classes. Extensions

beyond the end of classes must have the consent of the instructor, the department Chair and the Associate Dean, Undergraduate Studies. Documentation is mandatory.

Late Submission Policy for Assignment: There will be strict deadlines for the assignments. Marks will be deducted for late assignments. 10% per day will be subtracted for late assignments, to a maximum of 3 days late. These are group assignments: extensions for absence without supporting documentation will only apply if more than 40% of group members report absence without supporting documentation.

ATTENDANCE: Attendance is mandatory for all lectures, one lab per assignment, and demos.

FACULTY OF ENGINEERING POLICIES:

Students must familiarize themselves with the policies of the Faculty of Engineering

<https://www.eng.uwo.ca/electrical//pdf/2025-UG-Policy-and-Procedures.pdf>